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Insurance Losses
Personal Injury Protection Coverages

INJURY CLAIM FREQUENCIES FOR VOLKSWAGEN RABBITS WITH AUTOMATIC AND MANUAL SEAT BELTS

1981 AND 1982 MODELS

Research Report HLDI A-21
April 1984

Highway Loss Data Institute
Watergate Six Hundred
Washington, D.C. 20037

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Summary

Volkswagen (VW) offers an automatic seat belt system as optional equipment on its Rabbit models. This system is designed to automatically position a shoulder belt around the driver and front seat passenger when they enter the car. Belt use in traffic in VW Rabbits with automatic belts is about 50 percent higher than in Rabbits with standard manual belts. Seat belts, when worn, reduce the chances of death and serious injury in a crash by about 50 percent. The expected reductions in insurance injury claims, which include many minor injuries as well as whiplash and other injuries for which seat belts have limited effectiveness, however, have not been documented.

This Highway Loss Data Institute (HLDI) report compares the frequency of claims for injuries to occupants of 1981 and 1982 model year VW Rabbits that were sold with automatic and manual seat belts to determine the extent to which the higher belt use in Rabbits with automatic belts results in improved insurance injury claim experience. The results are based on personal injury protection and collision coverage loss experience for September 1980 through September 1983.

Principal Findings:

- The overall frequency of claims for occupant injuries in VW Rabbits with automatic seat belts was 14 percent lower than for comparable Rabbits with manual belts. Virtually all of the difference was in the frequency of injuries in crashes for which a collision coverage claim was also made. Such crashes are more likely to be frontal.

- Comparable reductions were found in the frequency of injuries with medical losses exceeding $250, $500, and $1,000. In each of these categories of medical loss, most of the reductions were in the frequency of injury claims in crashes with an associated collision coverage claim.

- The reductions in overall injury claim frequencies for VW Rabbits with automatic belts were somewhat greater among the two-door models than the four-door models.

- The percentage of all collision coverage claims for VW Rabbits with associated personal injury protection claims was consistently lower for cars with automatic belts than for those with manual belts when the collision damage was between $1,001 and $6,000.

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Introduction

The Highway Loss Data Institute (HLDI) is a nonprofit, public service organization that gathers, processes, and publishes insurance data concerning the human and economic losses associated with motor vehicles - especially the ways such losses vary among different kinds of vehicles.

Since 1975 Volkswagen (VW) has offered an automatic seat belt system as optional equipment on its Rabbit models sold in the United States. This system is designed to automatically position a shoulder belt around the driver and front seat passenger. In place of a lap belt, a knee restraint is included that is intended to restrain the lower body in frontal crashes.

In contrast to standard three-point manual belts, which require buckling each time an occupant enters a car, automatic belts require no action by the occupants. As a result, more occupants are expected to be restrained in crashes of cars equipped with automatic belts than in crashes of cars with manual belts. VW automatic belts, however, can be disconnected and consequently their automatic nature does not ensure 100 percent use. Belt use rates in VW Rabbits with automatic belts observed on the highways are about 50 percent higher than VW Rabbits with manual belts.[1] The more important measure of belt use by occupants involved in crashes, which is typically lower than observed use in traffic, is not so well established. However, indications from police accident reports are that usage in crashes is some 20 to 30 percent higher for VW Rabbits with automatic belts than it is for VW Rabbits with manual belts.[2] Seat belts, when worn, reduce the chances of death and serious injury in a crash by about 50 percent. The expected reduction in insurance injury claims, which include many minor injuries as well as whiplash and other injuries for which belts have limited effectiveness, however, have not been documented.

Since the 1981 model year, the Vehicle Identification Numbers (VINs) of cars with automatic restraint systems, such as automatic belts or air bags, are required by federal standard to contain information identifying the restraint. Thus, it is possible to identify from their VINs VW Rabbits sold with automatic seat belts. The present study compares the insurance injury experience of two groups of 1981 and 1982 VW Rabbits — one group sold with automatic belts and the other with manual belts — to determine the influence of the belt systems on their losses. It should be noted that HLDI data cannot identify the seating positions of injured claimants. Because it is likely that some of the personal injury protection claims in this study are for rear seat occupants, where seat belt systems are manual, the actual effects of the automatic belts in the front seats are larger than shown by these comparisons.

The results in this report are based on personal injury protection and collision coverage loss experience for September 1980 through September 1983. The data used in this report were provided by 11 insurers: Aetna, Allstate, GEICO, Kemper, Liberty Mutual, Nationwide, Prudential, Safeco, State Farm, Travelers, and USAA.

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[1] Lund, Adrian K., and Williams, Allan F. "Trends in Driver Seat Belt Use in the United States, 1978-1983." Attachment A to Accompany the Statement of William Haddon, Jr., M.D., Insurance Institute for Highway Safety before the United States Department of Transportation Hearings on Federal Motor Vehicle Safety Standard 208, Occupant Crash Protection, December 5-7, 1983.

[2] Chi, George Y. H. and Reinfurt, Donald W., "A Comparison of the Automatic Shoulder Belt/Knee Bolster Restraint System with the Lap and Shoulder Belt System in VW Rabbits." Highway Safety Research Center, University of North Carolina, HSRC-PR98, March 1981.

Results and Discussion

The results presented in this report are based on 51,970 insured vehicle years of exposure for VW Rabbits with manual belts and 32,084 insured vehicle years of exposure for VW Rabbits with automatic belts. Only the experience of VW Rabbits with both personal injury protection *and* collision coverage simultaneously in effect was included in this report. Table 1 summarizes the overall injury claim frequency results for the two groups of Rabbits.* The overall injury claim frequency for the Rabbits with manual belts was 16.9 injury claims per 1,000 insured vehicle years. In contrast, the overall claim frequency for Rabbits with automatic belts was 14 percent lower with 14.5 claims per 1,000 insured vehicle years.

The overall injury claim frequencies shown in Table 1 were separated into two components: injuries in which there was a collision coverage claim for the same crash and injury claims for which there was no associated collision coverage claim. In the overwhelming majority of crashes with injury claims, there is vehicle damage even when there is no collision claim. In these crashes the damage costs are either recovered through a property damage liability claim from the insurer of other involved vehicles that were at fault, they are below the collision deductible amount, or they are not being recovered through automobile insurance. Collision coverage claims often are for the vehicle at fault. Consequently they tend to be dominated by front-end damage, whereas property damage liability claims are for the vehicle *not* at fault and they are dominated by rear-end damage. Thus, injury claims with associated collision coverage claims are more likely to be from frontal crashes, and injuries with no associated collision coverage claims are more likely to be from rear-end crashes. The results shown in Table 1 strongly suggest that such a distinction occurs. There is no difference between the overall injury claim frequencies for VW Rabbits with automatic and manual belts when there is no associated collision coverage claim. To the extent that these injuries are whiplash and other injuries resulting from rear-end impacts where belt systems are not expected to produce much benefit, the increased belt use in the Rabbits with automatic belts should not substantially influence the frequency of such injuries.

TABLE 1
Personal Injury Protection Coverages
Injury Claim Frequencies for VW Rabbits with Automatic and Manual Seat Belts — 1981 and 1982 Models

Type of Injury Claim	Associated Collision Coverage Claim	No. of Injury Claims		Claim Frequency per 1,000 Insured Vehicle Years*		Percent Change
		Manual Belts	Automatic Belts	Manual Belts	Automatic Belts	
All Injury	Yes	518	238	9.9	7.5	−24%
All Injury	No	368	224	7.0	7.0	0%
All Injury		886	462	16.9	14.5	−14%

* Results are standardized to the following distribution of exposure:

Operator Age Group	Body Style	
	Two-Door	Four-Door
Youthful	6%	5%
Nonyouthful	37%	52%

* These results are standardized to ensure that the same mix of exposure from youthful and nonyouthful operators and two- and four-door models contribute to each result.

However, the two groups of cars show pronounced differences in the frequencies of injury claims with associated collision coverage claims, i.e., for those crashes more likely to be frontal impacts where belt systems are most effective. The frequency of injury claims where there are also associated collision coverage claims is 24 percent lower for the Rabbits with automatic belts than for the Rabbits with manual belts.

Table 2 shows similar results to Table 1 for injury claims with medical losses exceeding $250, $500, and $1,000. The results in Table 2 show the same pattern as the results in Table 1: in each injury category the claim frequency results for the Rabbits with automatic belts are lower than for Rabbits with manual belts. In addition, most of these reductions are for injuries for which there are also associated collision coverage claims.

TABLE 2
Personal Injury Protection Coverages
Injury Claim Frequencies by Size of Claim for VW Rabbits
with Automatic and Manual Seat Belts — 1981 and 1982 Models

Type of Injury Claim	Associated Collision Coverage Claim	Claim Frequency per 1,000 Insured Vehicle Years*		Percent Change
		Manual Belts	Automatic Belts	
Injury > $250	Yes	4.4	3.3	−25%
	No	3.0	3.0	0%
		7.4	6.3	−15%
Injury > $500	Yes	2.9	2.3	−21%
	No	2.2	2.1	−5%
		5.1	4.4	−14%
Injury > $1,000	Yes	1.9	1.6	−16%
	No	0.8	0.7	−12%
		2.7	2.3	−15%

* Results are standardized to the following distribution of exposure:

Operator Age Group	Body Style	
	Two-Door	Four-Door
Youthful	6%	5%
Nonyouthful	37%	52%

Table 3 shows injury claim frequency results separately for each body style. For both the two- and four-door Rabbits with automatic belts, the overall injury claim frequency results are lower than for the comparable Rabbits with manual belts. As in Tables 1 and 2, virtually all of the reductions are for injuries with associated collision coverage claims.

Table 4 presents the percentages of *all* collision coverage claims for VW Rabbits that have associated personal injury protection claims by seat belt type for different ranges of collision damage.* When the damage is between $1,001 and $6,000, the percentages of collision claims with associated personal injury protection claims is consis-

* Tables 1 through 3 included results for injury claims that had an associated collision coverage claim. In Table 4 *all* collision claims for Rabbits are considered whether or not an injury was claimed.

tently lower for Rabbits with automatic belts than for those with manual belts. Within this range, the reductions in the percent of collision claims for Rabbits with automatic belts becomes larger as the damage amount increases. For damage amounts up to $1,000, there are only small differences in the percentages of collision claims with personal injury protection claims. For damage amounts above $6,000, the Rabbits with automatic belts have somewhat higher percentages of collision claims with injury claims than those with manual belts. The extent to which these are real increases, or are due to sampling variations because of the small number of collision claims in this range, cannot be established from these data.

The results shown in Tables 1 through 4 strongly suggest that the automatic belt system offered on VW Rabbits reduces the frequency of injuries in such cars and that these reductions mainly occur in the cases where the crash damage is between $1,001 and $6,000.

TABLE 3
Personal Injury Protection Coverages
Overall Injury Claim Frequencies for VW Rabbits with Automatic and Manual Seat Belts by Body Style — 1981 and 1982 Models

Body Style	Associated Collision Coverage Claim	Claim Frequency per 1,000 Insured Vehicle Years*		Percent Change
		Manual Belts	Automatic Belts	
Two-door	Yes	10.2	7.4	−27%
	No	7.6	7.0	−8%
		17.8	14.4	−19%
Four-door	Yes	9.5	7.5	−21%
	No	6.7	7.1	+6%
		16.2	14.7	−9%

* Results are standardized to the following distribution of exposure:

Operator Age Group	Distribution
Youthful	11%
Nonyouthful	89%

TABLE 4
Percentage of VW Rabbit Collision Coverage Claims with Associated Personal Injury Protection Claims by Belt Type and Amount of Collision Damage – 1981 and 1982 Models

Collision Damage Amount	Type of Belt	No. of Collision Claims	Average Amount of Collision Damage	Percent of Collision Claims with Injury Claim PIP Injury Claim Size			
				All	>$250	>$500	>$1,000
$1 - $1,000	Manual	2,114	$496	2.2%	0.9%	0.6%	0.4%
	Automatic	1,334	$486	2.9	1.1	0.8	0.6
			Difference	+0.7	+0.2	+0.2	+0.2
$1,001 - $2,000	Manual	909	$1,434	9.7	2.9	1.8	0.9
	Automatic	498	$1,439	6.6	2.4	1.4	0.6
			Difference	−3.1	−0.5	−0.4	−0.3
$2,001 - $3,000	Manual	412	$2,452	18.9	6.3	2.7	1.5
	Automatic	242	$2,452	15.3	5.8	2.1	1.2
			Difference	−3.6	−0.5	−0.6	−0.3
$3,001 - $4,000	Manual	199	$3,441	31.2	13.6	11.1	6.5
	Automatic	129	$3,429	25.6	12.4	10.1	5.4
			Difference	−5.6	−1.2	−1.0	−1.1
$4,001 - $6,000	Manual	233	$4,942	57.9	28.8	19.3	14.2
	Automatic	99	$4,901	37.4	11.1	6.1	5.1
			Difference	−20.5	−17.7	−13.2	−9.1
>$6,000	Manual	171	$7,229	57.9	35.1	31.6	18.7
	Automatic	93	$7,131	60.2	37.6	34.4	25.8
			Difference	+2.3	+2.5	+2.8	+7.1

Appendix A
Standardization

Insurance loss experience varies in relation to certain nonvehicle factors. One important factor that influences loss experience is operator age. Youthful operators have worse loss experience than older drivers. Thus, the different proportions of youthful operators must be taken into consideration in comparing the loss experience of vehicles.

To remove any biases that could result because of variations among different vehicles in an operator age group, the PIP injury coverage results for 1981 and 1982 Volkswagen Rabbits were weighted, or standardized, to produce a weighted average of actual results. The weights used in the standardization procedure are shown below.

Operator Age Group	Distribution
Youthful	11%
Nonyouthful	89%

Because different body styles can also influence loss experience, and because the mix of body styles was not the same for Rabbits with automatic and manual belts, results were also standardized to the same mix of body styles, using the weights shown below.

Operator Age Group	Body Style	
	Two-Door	Four-Door
Youthful	6%	5%
Nonyouthful	37%	52%

Because the same weights were always used, the effects due to the nonvehicle factor of operator age were present in equal amounts in the standardized results. Therefore, to the extent that operator age distribution does not vary substantially for different vehicles, these effects will not bias comparisons of results.

The standardization procedure employed is widely used in health statistics.* The basic principle of the method is the introduction of a selected population with a *standard* distribution across operator age group, or across the combination of operator age group and body style, as represented by the standardization weights in the tables.

* For example, see Armitage, P. *Statistical Methods in Medical Research*, Wiley, New York (1971).

Appendix B
Definitions

Claim Frequency — The number of claims for a group of vehicles, divided by the exposure for that group; expressed as claims per 1,000 insured vehicle years.

Collision Coverages — As defined in insurance contracts, the coverage under which people insure their own vehicle against loss caused by collision.

Deductible Amount — That portion of the collision damage cost borne by the policyholder.

Exposure — The time interval an individual vehicle is insured. Exposure for a group of vehicles is expressed in units of insured vehicle years.

Operator Age Group — The factor which distinguishes those vehicles whose rated driver is youthful from those vehicles whose rated driver is not youthful (see Youthful Operator).

Personal Injury Protection (PIP) Coverage — First-party no-fault coverage in which the insurer pays, within the specified limits, the medical, hospital, and other expenses of the insured, others in his vehicle, and pedestrians struck by him.

Rated Driver — The driver who, for insurance purposes, is considered to represent the greatest loss potential for the insured vehicle.

Vehicle Identification Number (VIN) — A code, variously comprising both numbers and letters; normally 8 to 17 characters in length, assigned to each vehicle by its manufacturer. The VIN uniquely identifies the vehicle within at least a ten-year time span and, in recent model year vehicles, contains coding which identifies the make, series, model year, and other characteristics of each vehicle.

Youthful Operator — For the purposes of this report, all males (married or single) under 25 years of age and all unmarried females under 25 years of age.

List of Publications

Research reports published by the Highway Loss Data Institute are:

R72-1 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1972 Models,* June 1973.

R73-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1973 Models Compared with 1972 Models,* September 1973.

R73-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models,* March 1974.

R73-3 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Two years,* December 1974.

R73-4 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Three Years,* December 1975.

R74-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1974 Models,* May 1974.

R74-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1974 Models During Their First Year ,* December 1974.

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R75-1 *Automobile Insurance Losses, Collision Coverages, Initial Results for 1975 Models,* July 1975.

R75-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1975 Models During Their First Year,* December 1975.

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R76-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1976 Models During Their First Year, 1975 Models During Their First Two Years, 1974 Models During Their First Three Years,* December 1976.

R77-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1977 Models,* June 1977.

R77-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1977 Models During Their First Year, 1976 Models During Their First Two Years, 1975 Models During Their First Three Years,* December 1977.

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R78-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1978 Models During Their First Year, 1977 Models During Their First Two Years, 1976 Models During Their First Three Years,* January 1979.

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R79-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1979 Models During Their First Year, 1978 Models During Their First Two Years, 1977 Models During Their First Three Years,* December 1979.

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R80-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1980 Models During Their First Year, 1979 Models During Their First Two Years, 1978 Models During Their First Three Years,* December 1980.

R81-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1981 Models,* July 1981.

R81-2 *Insurance Losses, Collision Coverages; Passenger Cars, Vans; Pickups, and Utility Vehicles; 1981 Models During Their First Year, 1980 Models During Their First Two Years, 1979 Models During Their First Three Years,* December 1981.

R82-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1982 Models,* July 1982.

R82-2 *Insurance Losses, Collision Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1982 Models During Their First Year, 1981 Models During Their First Two Years; 1980 Models During Their First Three Years,* December 1982.

R83-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1983 Models,* June 1983.

R83-2 *Insurance Losses, Collision Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1983 Models During Their First Year, 1982 Models During Their First Two Years, 1981 Models During Their First Three Years,* January 1984.

V78-1 *Automobile Insurance Losses, Non-Commercial Collision Coverages; Variations by Make and Series, Vans, Pickups and Utility Vehicles; 1978 Models During Their First Year, 1977 Models During Their First Two Years,* February 1979.

V79-1 *Automobile Insurance Losses, Non-Commercial Collisions Coverages; Variations by Make and Series, Vans, Pickups and Utility Vehicles; 1979 Models During Their First Year, 1978 Models During Their First Two years,* April 1980.

V79-2 *Automobile Insurance Losses, Personal Injury Protection Coverages; Claim Frequency Results by Size of Claim for 1977, 1978, and 1979 Vans, Pickup Trucks, and Utility Vehicles,* October 1980.

V79-3 *Insurance Theft Losses; Vans, Pickups, and Utility Vehicles, 1979 Models,* May 1981.

V80-1 *Automobile Insurance Losses, Non-Commercial Collision Coverages; Variations by Make and Series, Vans, Pickups, and Utility Vehicles; 1980 Models During Their First Year, 1979 Models During Their First Two Years, 1978 Models During Their First Three Years,* December 1980.

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I75-2 *Automobile Insurance Losses, Percentage of Collision Claims with Associated Injury Claims for 1974 and 1975 Models,* March 1977.

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I82-1 *Insurance Losses, Personal Injury Protection Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles,* September 1983.

A-1 *Automobile Insurance Losses, Collision Coverages; A Comparison of Results for 1972 and 1973 Models,* May 1974.

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A-4 *Automobile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Density, 1974 and 1975 Models,* December 1975.

A-5 *Automobile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Body Style, 1974 and 1975 Models,* December 1975.

A-6 *Automobile Insurance Losses, Collision Coverages; An Investigation of Relationships Between Losses and Engine Specifications, Using 1973 Models,* June 1976.

A-7 *Automobile Insurance Losses, Collision Coverages; Annual Increases and Seasonal Variations 1972, 1973, 1974 and 1975 Models,* June 1976.

A-8 *Automobile Insurance Losses, Injury Coverages; A Preliminary Comparison of Results for Volkswagen Rabbits with Passive and Active Seat Belts, 1975 and 1976 Models,* June 1977.

A-9 *Automobile Insurance Losses, Collision Coverages; A Comparison of Collision Claim Size Distributions for 1974, 1975, and 1976 Models,* November 1977.

A-10 *Automobile Insurance Losses, Injury Coverages; Comparisons of Claim Frequencies of Volkswagen Rabbits with Automatic and Manual Seat Belts, 1975, 1976, and 1977 Models,* June 1979.

A-11 *Automobile Insurance Losses, Collision Coverages; The Consistency of the Loss Experience of Specific Vehicles Produced in Several Years, 1975 to 1978 Models,* June 1979.

A-12 *Automobile Insurance Losses, Collision Coverages; An Assessment of the Effects of the Federal Safety Bumper Standard on the Losses for 1972 Through 1978 Models,* June 1980.

A-13 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverages; The Effects of Car Size on Crash Losses, 1977-1980 Models,* May 1981.

A-14 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverages; Comparisons of the Loss Experience of Two- and Four-Door Cars, 1978, 1979, and 1980 Models,* June 1981.

A-15 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverages; Relationships Between Injury and Collision Losses and Engine Options for Selected 1977-1979 Compact Cars,* June 1981.

A-16 *Automobile Insurance Losses, Collision Coverages; The Frequency of Claims Involving Salvage; Subcompact and Compact Cars; 1980 Models,* January 1982.

A-17 *Insurance Losses, Comprehensive Coverages; Non-Crash Fire Losses; 1979-1980 Models,* February 1982.

A-18 *Insurance Losses, Theft Coverages; The Distribution of Theft Loss Payment Amounts; Passenger Cars, Vans Pickups, and Utility Vehicles; 1981 Models During Their First Year, 1980 Models During Their First Two Years; 1979 Models During Their First Three Years,* June 1982.

A-19 *Insurance Losses, Theft Coverages; A Comparison of the Theft Loss Experience of General Motors Passenger Cars With and Without Factory-Installed Theft Deterrent Systems; 1980-1981 Models,* January 1983.

A-20 *Insurance Losses, Collision Coverages, A Comparison of the Collision Loss Experience of Subaru Models with 5 and 2.5 MPH Bumpers,* April 1983.

A-21 *Insurance Losses, Personal Injury Protection Coverages, Injury Claim Frequencies for Volkswagen Rabbits with Automatic and Manual Seat Belts, 1981 and 1982 Models,* April 1984.

T79-1 *Automobile Insurance Theft Losses by Make and Series; 1979 Models,* June 1980.

T80-1 *Automobile Insurance Theft Losses by Make and Series; 1979 and 1980 Models,* April 1981.

T81-1 *Insurance Losses, Theft Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1981 Models During Their First Year, 1980 Models During Their First Two Years, 1979 Models During Their First Three Years,* May 1982.

T82-1 *Insurance Losses, Theft Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1982 Models During Their First Year, 1981 Models During Their First Two Years, 1980 Models During Their First Three Years,* May 1983.

Research Report HLDI A-22
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Insurance Losses, Collision Coverages

AN ANALYSIS OF SALVAGE CREDITS 1977 THROUGH 1982 MODEL YEAR CARS

Highway
Loss
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Watergate 600, Washington, D.C. 20037

Insurance Losses, Collision Coverages

AN ANALYSIS OF SALVAGE CREDITS

1977 THROUGH 1982 MODEL YEAR CARS

Research Report A-22
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Highway Loss Data Institute
Watergate Six Hundred
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Summary

This Highway Loss Data Institute (HLDI) report summarizes trends in the frequency with which crash damaged new cars were sold for salvage since 1977. The results are based on the frequency of salvage credits paid under collision coverage for 1977-82 model year passenger cars. Salvage credits occur when the estimated collision repair cost exceeds the replacement value of the car, less its salvage value. This study was prompted by concerns that more recent model year cars are more likely to be declared total losses and sold as salvage than were earlier models.

Principal Findings

- The percentages of collision coverage claims with salvage credits have increased somewhat for the 1977 through 1982 models. The overall percentage of collision coverage claims with salvage credit for cars in their first two years remained below five percent for all six model years.

- The relationship between car size and salvage rates is pronounced: smaller cars have approximately double the percentage of collision coverage claims with salvage credits than do larger cars.

- The changing exposure by car size is reflected by changes in the overall salvage rates. Increasing numbers of small cars, for example, increase the overall salvage rate.

- Salvage rates do not vary substantially by body style.

- It is not possible to determine whether crash damaged unibody cars are more likely to be salvaged than cars with separate frames because unibody cars are all smaller than cars with frames, and size has a pronounced effect on the frequency of salvage.

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Introduction

The Highway Loss Data Institute (HLDI) is a nonprofit, public service organization that gathers, processes, and publishes insurance data concerned with human and economic losses associated with motor vehicle use, and especially with the ways such losses vary among different kinds of vehicles.

This report presents information on the frequency with which 1977-82 model year cars have collision coverage claims with estimated repair costs so high that the car was declared a total loss and sold as salvage. The percentage of cars sold as salvage rather than repaired is referred to as the salvage rate.*

It is intended that the dissemination of this and other HLDI reports will contribute to research into ways for reducing vehicle-related damage to people and property, as well as provide the public with information relating to the differences in the crash damage produced by different kinds of vehicles.

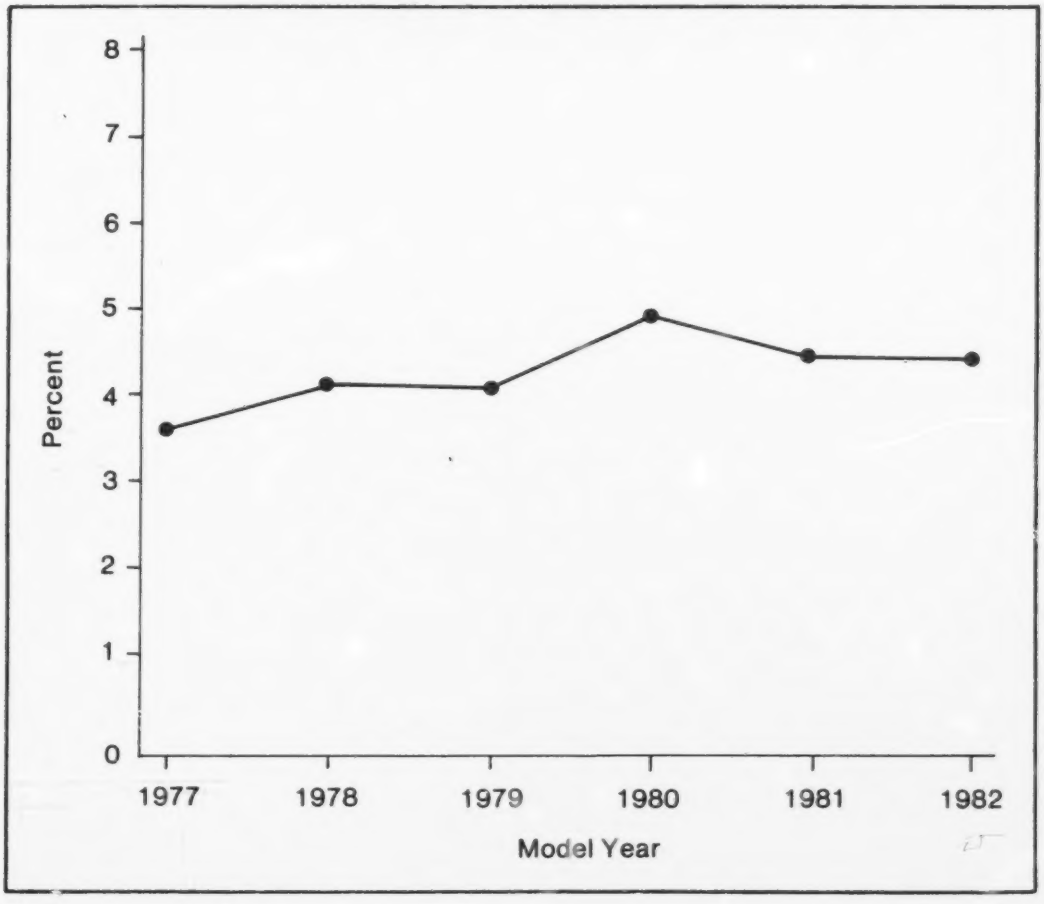
* The HLDI data systems recognize a total loss by the presence of a salvage recovery transaction associated with the payment to the insured for his total loss. In some instances, the insured elects to keep his damaged car and the value of the salvage is deducted from his settlement. HLDI, in these cases, would fail to identify them as salvage claims and, to the extent that this happens, would be understating salvage rates. However, a survey of the insurers whose data form the basis of this report indicates that these are extremely rare events for the relatively new cars reported here and that they would not affect any of the conclusions as presented.

Results and Discussion

Overall Salvage Trend

Figure 1 displays overall salvage rates for all 1977-82 passenger cars during their first two years of availability. The figure indicates a slightly increasing trend in salvage rates through 1980 models followed by a slight drop for 1981 and 1982 models. The percentage of collision claims with salvage credits has changed only slightly for these model years over this period. The rate has remained between four and five percent for the last five of the six model years considered in this study.

FIGURE 1
The Percentage of
Collision Coverage Claims with Salvage Credits
1977-1982 Passenger Cars in Their First Two Years of Availability

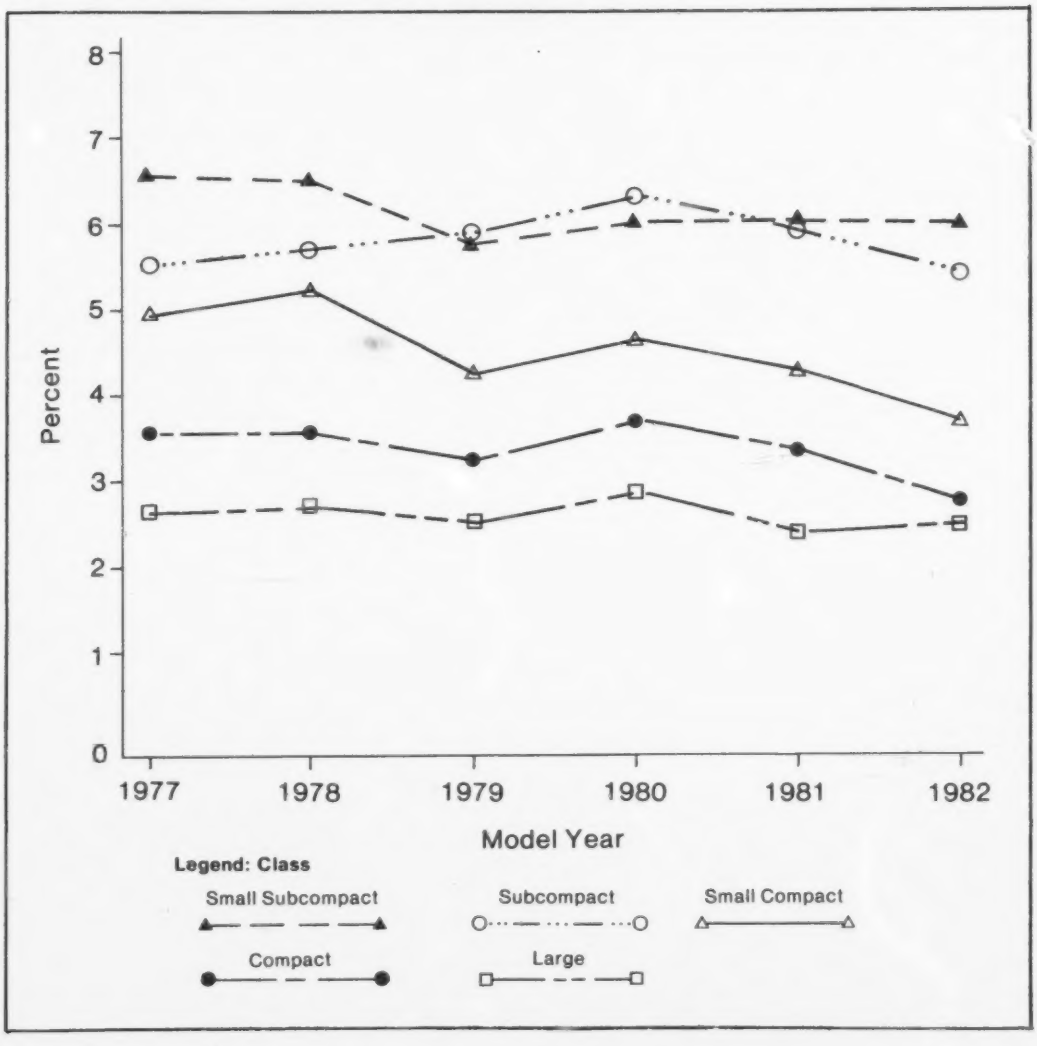


Salvage Results by Size Class

Figure 2 shows the salvage experience for model years 1977-82 for five size classes of vehicles — small subcompacts, subcompacts, small compacts, compacts, and large cars.* With the exception of the overlapping salvage rates for small subcompact and subcompact cars, there is a pronounced relationship between car size and salvage rates. In general, the smaller the car, the more likely it will be salvaged following a crash; that is, small cars have the highest salvage rates and large cars have the lowest. The rates for the smaller cars are about double those for the larger cars.

* See the appendix for size class definitions.

FIGURE 2
The Percentage of
Collision Coverage Claims with Salvage Credits
1977-1982 Passenger Cars in Their First Two Years of Availability
By Size Class



A number of factors probably contribute to the higher salvage rates for small cars. For instance, larger cars generally have higher initial costs and higher replacement values; therefore, a given amount of damage sustained in a crash may not exceed the replacement value of a larger more expensive car, whereas it might exceed the replacement value of a smaller less expensive car. In addition, because of its mass disadvantage, the smaller and lighter vehicle will typically sustain more damage in a two-car crash, thus adding to the salvage rates for small cars.

Salvage Results by Size Class and Body Style

Table 1 shows the salvage rates for each model year for 1977-82 by size class and body style — two-door, four-door, station wagon, and sports and specialty models. Within size class and body style subgroups, salvage rates have remained basically stable during this period with relatively minor year-to-year fluctuations. In general, sports and specialty models have slightly lower salvage rates than the other body styles; this difference is probably due to their higher replacement costs.

TABLE 1
The Percentage of Collision Coverage Claims with Salvage Credits
1977-1982 Model Year Passenger Cars
By Body Style and Size Class

Size Class	Model Year	Body Style			
		Two-Door	Four-Door	Station Wagon	Sports & Specialty
Small Subcompact	1977	6.9	8.4	5.4	4.6
	1978	6.8	5.6	5.3	5.0
	1979	6.0	5.0	5.0	4.6
	1980	6.3	3.2	5.7	4.4
	1981	6.6	5.2	5.2	4.5
	1982	6.6	5.3	4.7	5.5
Subcompact	1977	5.6	5.3	5.2	5.1
	1978	5.3	6.6	5.9	5.3
	1979	5.9	6.3	5.5	4.6
	1980	6.3	6.8	4.3	4.4
	1981	6.0	6.3	4.5	5.4
	1982	5.6	5.4	5.0	4.7
Small Compact	1977	4.9	6.6	*	3.5
	1978	5.8	5.1	4.6	4.9
	1979	4.7	4.3	3.7	3.5
	1980	5.2	4.4	4.6	3.8
	1981	4.8	4.1	4.1	3.9
	1982	3.7	3.7	3.7	3.4
Compact	1977	3.7	3.5	4.3	3.4
	1978	3.5	3.6	3.1	3.8
	1979	3.1	3.2	2.8	3.6
	1980	3.6	2.2	3.3	3.6
	1981	3.3	2.8	3.2	3.9
	1982	3.0	2.8	2.4	2.8
Large	1977	2.8	2.6	2.6	2.6
	1978	2.9	2.7	2.7	2.6
	1979	2.6	2.6	2.6	2.5
	1980	3.2	3.1	3.1	2.4
	1981	2.5	2.6	2.6	2.1
	1982	2.2	3.0	2.1	2.0

*No data were available for small compact station wagons for the 1977 model year.

Other Factors That Might Influence Salvage Rates

Concerns have been expressed that cars with unibody construction have higher salvage rates than cars with separate frames. However, cars with unitized bodies are invariably smaller than those with separate frames. Because car size is such an important factor in salvage rates, even among cars of the same construction type, it is not possible to compare salvage rates for otherwise comparable cars with different types of construction.

Differences in salvage rates between foreign and domestic cars were also compared. When comparably sized domestic and imported cars are compared, the percentage of collision claims resulting in salvage credits is higher for domestic models than for imported cars. As before, it seems likely that differences in replacement costs account for a large part of this difference.

Size Class Exposure Distributions

Because smaller cars have substantially higher salvage rates than larger cars, it is clear that significant changes in vehicle mix from year to year will affect overall salvage rates. As shown in Table 2, the distribution of vehicle exposure by size class has undergone major shifts in the six years considered in the study. During this period, the share of total exposure accounted for by large cars was dramatically reduced. In 1977, large cars accounted for 60 percent of the total model year exposure; by 1980, their share had dropped to only 14 percent. During the same period, the share of small car exposure increased from 22 percent to about 50 percent.

These rather pronounced shifts in exposure are reflected in the overall salvage rates as shown in Figure 1. As the proportion of small cars increased from 1977 through 1980, there was an associated increasing trend in salvage rates. As can be seen in Table 2, the percentage of exposure for each size class stabilized after 1980, and as seen in Figure 1, the 1980 model year also marked the end of increases in overall salvage rates.

TABLE 2
The Percentage of Total Model Year Exposure
1977-1982 Model Year Passenger Cars by Size Class

Vehicle Size Class	Model Year					
	1977	1978	1979	1980	1981	1982
Small Subcompact	14	16	20	27	28	27
Subcompact	8	13	18	22	22	25
Small Compact	1	6	5	14	15	20
Compact	17	31	29	23	21	13
Large	60	34	28	14	14	15
Total	100%	100%	100%	100%	100%	100%

Appendix

Definitions

Claim Frequency - The number of claims for a group of vehicles, divided by the exposure for that group; expressed as claims per one hundred insured vehicle years.

Collison Coverages - As defined in insurance contracts, the coverage under which people insure their own vehicle against loss caused by collision.

Deductible Amount - That portion of the collision damage cost borne by the policyholder. For computing results, deductible amounts are split into two groups; less that $150 (mainly $50 and $100 deductibles) and greater than or equal to $150 (mainly $200 and $250 deductibles).

Exposure - The time interval an individual vehicle is insured. Exposure for a group of vehicles is expressed in units of insured vehicle years.

Loss Payment - That portion of the collision damage cost borne by the insurer; in general, the total collision damage cost minus the deductible amount.

Operator Age Group - The factor which distinguishes those vehicles whose rated driver is youthful from those vehicles whose rated driver is not youthful (see Youthful Operator).

Rated Driver - The driver who, for insurance purposes, is considered to represent the greatest loss potential for the insured vehicle.

Salvage Credit - Occurs when the estimated collision repair cost exceeds the replacement value of the car.

Vehicle Size Class - There are four major body style groupings of passenger cars — regular two-door models, regular four-door models, station wagons, and sports and specialty models. Sports and specialty models include all two-seater cars, all convertibles, those cars larger than subcompacts which have two-door models only, and all luxury cars. Each body style group is further divided into size class subgroups as follows:

Small Subcompact - Cars with wheelbases less than or equal to 96 inches.

Subcompact - Cars with wheelbases greater than 96 inches and less than or equal to 101 inches.

Small Compact - Cars with wheelbases greater than 101 inches and less than or equal to 106 inches.

Compact - Cars with wheelbases greater than 106 inches and less than or equal to 111 inches.

Large - Cars with wheelbases greater than 111 inches.

Vehicle Series - A name denoting a family of vehicles, within a make, with the same wheelbase and a degree of commonality in construction such as body, chassis, etc.

Youthful Operator - For the purposes of this report, all males (married or single) under 25 years of age and all unmarried females under 25 years of age.

List of Publications

Research reports published by the Highway Loss Data Institute are:

R72-1 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1972 Models,* June 1973.

R73-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1973 Models Compared with 1972 Models,* September 1973.

R73-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models,* March 1974.

R73-3 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Two years,* December 1974.

R73-4 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Three Years,* December 1975.

R74-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1974 Models,* May 1974

R74-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1974 Models During Their First Year,* December 1974.

R74-3 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1974 Models During Their First Two Years,* December 1975.

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R80-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1980 Models During Their First Year, 1979 Models During Their First Two Years, 1978 Models During Their First Three Years,* December 1980.

R81-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1981 Models,* July 1981.

R81-2 *Insurance Losses, Collision Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1981 Models During Their First Year, 1980 Models During Their First Two Years, 1979 Models During Their First Three Years,* December 1981.

R82-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1982 Models,* July 1982.

R82-2 *Insurance Losses, Collision Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1982 Models During Their First Year, 1981 Models During Their First Two Years; 1980 Models During Their First Three Years,* December 1982.

R83-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1983 Models,* June 1983.

R83-2 *Insurance Losses, Collision Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1983 Models During Their First Year, 1982 Models During Their First Two Years, 1981 Models During Their First Three Years,* January 1984.

R84-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1984 Models,* June 1984.

V78-1 *Automobile Insurance Losses, Non-Commercial Collision Coverages; Variations by Make and Series, Vans, Pickups and Utility Vehicles; 1978 Models During Their First Year, 1977 Models During Their First Two Years,* February 1979.

V79-1 *Automobile Insurance Losses, Non-Commercial Collisions Coverages; Variations by Make and Series, Vans, Pickups and Utility Vehicles; 1979 Models During Their First Year, 1978 Models During Their First Two years,* April 1980.

V79-2 *Automobile Insurance Losses, Personal Injury Protection Coverages; Claim Frequency Results by Size of Claim for 1977, 1978, and 1979 Vans, Pickup Trucks, and Utility Vehicles,* October 1980.

V79-3 *Insurance Theft Losses; Vans, Pickups, and Utility Vehicles, 1979 Models,* May 1981.

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V80-2 *Automobile Insurance Losses, Personal Injury Protection Coverages; Injury Claim Frequency Results by Size of Claim; Vans, Pickup Trucks, and Utility Vehicles, 1977-1980 Models,* September 1981.

I75-1 *Automobile Insurance Losses, Injury Coverages; Claim Frequency Results for 1974 and 1975 Models,* June 1976.

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I76-2 *Automobile Insurance Losses, Injury Coverages; Claim Frequency Results for 1974, 1975, and 1976 Models,* September 1978.

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I79-1 *Automobile Insurance Losses, Personal Injury Protection Coverages; Claim Frequency Results by Size of Claim for 1977, 1978, and 1979 Models,* October 1980.

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A-1 *Automobile Insurance Losses, Collision Coverages; A Comparison of Results for 1972 and 1973 Models,* May 1974.

A-2 *Automobile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Density, 1972 and 1973 Models,* September 1974.

A-3 *Automobile Insurance Losses, Collision Coverages; A Comparison of Results for 1973, 1974 and 1975 Models,* July 1975.

A-4 *Automobile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Density, 1974 and 1975 Models,* December 1975.

A-5 *Automobile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Body Style, 1974 and 1975 Models,* December 1975.

A-6 *Automobile Insurance Losses, Collision Coverages; An Investigation of Relationships Between Losses and Engine Specifications, Using 1973 Models,* June 1976.

A-7 *Automobile Insurance Losses, Collision Coverages; Annual Increases and Seasonal Variations 1972, 1973, 1974 and 1975 Models,* June 1976.

A-8 *Automobile Insurance Losses, Injury Coverages; A Preliminary Comparison of Results for Volkswagen Rabbits with Passive and Active Seat Belts, 1975 and 1976 Models,* June 1977.

A-9 *Automobile Insurance Losses, Collision Coverages; A Comparison of Collision Claim Size Distributions for 1974, 1975, and 1976 Models,* November 1977.

A-10 *Automobile Insurance Losses, Injury Coverages; Comparisons of Claim Frequencies of Volkswagen Rabbits with Automatic and Manual Seat Belts, 1975, 1976, and 1977 Models,* June 1979.

A-11 *Automobile Insurance Losses, Collision Coverages; The Consistency of the Loss Experience of Specific Vehicles Produced in Several Years, 1975 to 1978 Models,* June 1979.

A-12 *Automobile Insurance Losses, Collision Coverages; An Assessment of the Effects of the Federal Safety Bumper Standard on the Losses for 1972 Through 1978 Models,* June 1980.

A-13 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverages; The Effects of Car Size on Crash Losses, 1977-1980 Models,* May 1981.

A-14 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverages; Comparisons of the Loss Experience of Two- and Four-Door Cars, 1978, 1979, and 1980 Models,* June 1981.

A-15 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverages; Relationships Between Injury and Collision Losses and Engine Options for Selected 1977-1979 Compact Cars,* June 1981.

A-16 *Automobile Insurance Losses, Collision Coverages; The Frequency of Claims Involving Salvage; Subcompact and Compact Cars; 1980 Models,* January 1982.

A-17 *Insurance Losses, Comprehensive Coverages; Non-Crash Fire Losses; 1979-1980 Models,* February 1982.

A-18 *Insurance Losses, Theft Coverages; The Distribution of Theft Loss Payment Amounts; Passenger Cars, Vans Pickups, and Utility Vehicles; 1981 Models During Their First Year, 1980 Models During Their First Two Years; 1979 Models During Their First Three Years,* June 1982.

A-19 *Insurance Losses, Theft Coverages; A Comparison of the Theft Loss Experience of General Motors Passenger Cars With and Without Factory-Installed Theft Deterrent Systems; 1980-1981 Models,* January 1983.

A-20 *Insurance Losses, Collision Coverages, A Comparison of the Collision Loss Experience of Subaru Models with 5 and 2.5 MPH Bumpers,* April 1983.

A-21 *Insurance Losses, Personal Injury Protection Coverages, Injury Claim Frequencies for Volkswagen Rabbits with Automatic and Manual Seat Belts, 1981 and 1982 Models,* April 1984.

A-22 *Insurance Losses, Collision Coverages, An Analysis of Salvage Credits, 1977 Through 1982 Model Year Cars,* July 1984.

T79-1 *Automobile Insurance Theft Losses by Make and Series; 1979 Models,* June 1980.

T80-1 *Automobile Insurance Theft Losses by Make and Series; 1979 and 1980 Models,* April 1981.

T81-1 *Insurance Losses, Theft Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1981 Models During Their First Year, 1980 Models During Their First Two Years, 1979 Models During Their First Three Years,* May 1982.

T82-1 *Insurance Losses, Theft Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1982 Models During Their First Year, 1981 Models During Their First Two Years, 1980 Models During Their First Three Years,* May 1983.

T83-1 *Insurance Losses, Theft Coverages; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1983 Models During Their First Year, 1982 Models During Their First Two Years, 1981 Models During Their First Three Years,* May 1984.